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Investigation of cluster structure effects in light nuclei with elastic scattering

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The description of the elastic scattering cross-section is very sensitive not only to the interaction potential between the projectile and the target nuclei, but also on and their structure. Therefore, elastic scattering measurements have been used to extract information about the dynamics and structures of the involved nuclei [1]. In this contribution, we are going to present the results of two of these elastic scattering measurements aimed to investigate the clustering structure in ^{12}N and ^{13}C nuclei. The first measurement, ^{12}N on ^{197}Au target, was performed at Cyclotron Institute of Texas A&M University, USA. The ^{12}N is a weakly-bound proton-rich nucleus, which can be described as a valence proton bound to a ^{11}C core (S_p=0.601 MeV). The ^{12}N radioactive beam was produced with the recoil separator MARS [2], using the ^{3}He(^{10}B,^{12}N) reaction, with an intensity of 1×10^3 pps and 73.3 MeV of energy. The detection setup consisted of three Double Sided Silicon Strip detectors (DSSD) with 128 vertical and 128 horizontal fixed strips segmented with 16x16 connecting 8 strips. The measured angular distributions, ranged from 40 to 130 degrees at laboratory system, will be present. Optical model calculations have been performed, and large total cross section was observed for this projectile. To investigate the breakup effect in the elastic scattering, we also performed continuum discretized coupled-channels calculations (CDCC) and results will be present. The second measurement consisted in the elastic scattering of the ^{13}C nucleus on ^{208}Pb target, performed at Tandar Laboratory, Argentina. Full angular distributions for the elastic scattering, ranging from θ_{Lab} = 30 to 150 degrees, were obtained at three, close to the barrier, energies, i.e., E_{Lab} = 59.8, 63.8 and 65.8 MeV. Results of the analysis with Optical Model, CC and CRC calculations, using the code FRESCO [3], will be present.

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